

now supplied with instruments, owned and installed by the Weather Bureau. Most of these special stations are either ranger headquarters or forest lookout stations, and the forest personnel act as observers.

The fire-weather forecasting service furnished in California can be divided broadly into two classes, one of these services being the telegraphic general fire warning forecasts which are sent out in advance of dangerous fire weather or anticipated lightning storms. These messages emanate from the San Francisco office of the Weather Bureau and are sent to designated fire-fighting agencies in those parts of the State affected. For convenience in this work the Weather Bureau has divided the State into 11 forecasting areas, designated by locality, such as North Coast, Siskiyou, Plateau, North Sierra, etc. The field personnel of the Forest Service have learned from experience to depend upon the reliability of these warnings. When one of these messages is received the tendency is for each man to be more alert; the lookout scans the country more closely, the fireman is on the qui vive, the fire dispatcher makes doubly certain of his sources of man power and equipment, the Ranger stays in closer touch with his protective organization. If a fire warning message comes over a week-end or holiday, often emergency men are hired as an additional preventive measure. If these messages come during the time a fire is burning, very often plans are changed accordingly, especially if the fire is not yet under control. These fire warnings are a very important aid in our fire control.

While such general, more or less broadcast warnings were of value, the need was apparent for more localized forecasts. Such a need is particularly great where there are large going fires. Accordingly, in 1929, through a cooperative agreement between the State, Weather Bureau, and the Forest Service, a portable forecasting unit was set up. This unit consisted of a truck, completely

equipped with meteorological instruments and a radio receiving set. The fire weather official was in charge of the unit and had, as an assistant, a radio operator. This unit operated in 1929 and 1930, and is on the job again this season. It is scheduled to visit every national forest throughout the State each season, as well as spending a proportionate amount of time in each State fire district. Contacts are made with Forest Service and State personnel and weather stations maintained by these agencies are checked and inspected. Daily forecasts are made from weather information received over the radio and through observation made by the fire weather officials. These forecasts are made for the locality in which the truck is stationed at the time. A central dispatching agency at the regional Forest Service office is kept informed of the location of the unit at all times, and it is dispatched whenever practicable to going fires anywhere in California.

So far, there have not been as many opportunities as was originally expected to make use of the unit on going fires. On those occasions, however, when forecasts have been given on going fires, the reports from the field as to its value have been most encouraging. For example, on one very large fire, in very inaccessible country, due to forecasts of favorable weather conditions for the following day, an order for a large number of men and additional supplies and equipment was canceled, and the Government saved a very considerable sum of money. Certainly, the value of localized fire warning service has been demonstrated through the performance of this portable forecasting unit. An extension of this localized service, together with a continuance of the constantly improving general fire weather warning forecasts, offers a major opportunity for improving systematic fire protection in California.

THE PROBABLE VALUES OF SEASONAL RAINFALL IN LOS ANGELES FROM 1850 TO 1877

By CHARLES C. CONROY

[Author's Abstract]

Some years ago the writer began to collect material bearing upon the rainfall of the Los Angeles area prior to the establishment of the United States Signal Service office in that city on July 1, 1877. This material was found in private journals and diaries, in printed accounts, and, after 1854, in the files of Los Angeles newspapers. These last yielded an abundance of information, and the author was finally enabled to discover practically every day on which rain had fallen over the entire period.

These daily statements were translated into numerical values by comparison with estimates based upon Weather Bureau measurements of rainfall for similarly described days after July 1, 1877. For example, it was found that days on which rain was said to have fallen steadily but not heavily throughout the day, when checked by the measurements, had an average precipitation of 1.32 inches. Using this method for other descriptions, it was possible to build up a table of daily estimates for the entire period 1850-1877. Monthly and seasonal results followed as a matter of course.

The conclusions were then checked by reference to the recorded measurements of rainfall at San Francisco and

San Diego for the same period, a ratio having been worked out for two 10-year periods—one dry and one wet—from the records of all three stations subsequent to July 1, 1877. The use of this method of checking required great care, since there was sometimes an inversion of monthly or even seasonal values, San Diego receiving more rain than San Francisco. Fortunately the local accounts prior to 1877 were in almost all cases so definite that estimates could be made with considerable assurance of their approximate accuracy.

Further checking was done for the period 1871-1877 through comparisons of daily barometric readings at San Francisco and San Diego. For this same period a series of measurements made at Los Angeles by proper exposure of a gage was also found, as were also similar measurements for a single year in the fifties.

No rigid mathematical investigation was possible by these means, but it is believed that the evaluated amounts have a margin of error under 15 per cent.

Since the results cover 27 years, the subsequent records of the Los Angeles Weather Bureau office from 1877 to date may be divided exactly into two equal periods.

The mean seasonal rainfall for the three is found to be as follows:

	Inches
1850-1877	14.09
1877-1904	15.33
1904-1931	14.53

The driest winter in the entire series was that of 1862-63, with an estimated rainfall of 4.30 inches; the wettest, that of 1883-84, with a measured rainfall of 38.18 inches.

In the first of these 27-year periods there was a relatively wet series of seasons from 1851 to 1862; two disastrously dry seasons followed; then came another relatively wet series ending on June 30, 1869, and finally a dry series ending on June 30, 1877.

The individual seasonal estimates are as follows:

	Inches		Inches
1850-51	8.60	1864-65	13.60
1851-52	15.30	1865-66	15.40
1852-53	17.20	1866-67	19.80
1853-54	15.50	1867-68	23.50
1854-55	18.00	1868-69	15.30
1855-56	12.60	1869-70	7.20
1856-57	5.90	1870-71	6.30
1857-58	18.50	1871-72	12.80
1858-59	10.20	1872-73	9.60
1859-60	18.60	1873-74	21.20
1860-61	13.70	1874-75	12.40
1861-62	32.00	1875-76	21.80
1862-63	4.50	1876-77	5.30
1863-64	6.20		

The author believes that the influence of the Brückner cycle and the double Wolf cycle are clearly discernible in the estimates made for the period 1850-1877, and that the results seem to forecast the early beginning of a wetter rainfall régime in this region.

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SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING NOVEMBER, 1931

By HERBERT H. KIMBALL, in charge, solar radiation investigations

For a description of instruments employed and their exposures, the reader is referred to the January, 1931, Review, page 41.

Table 1 shows that solar radiation intensities averaged above the normal values for November at Madison and slightly below normal at Washington and Lincoln.

Table 2 shows an excess in the total solar radiation received on a horizontal surface at Chicago, New York, and Fresno as compared with November normals for the respective stations; close to normal at Pittsburgh, La

Jolla, and Miami; and a deficit at Washington, Madison, Lincoln, Gainesville, and Twin Falls.

Skylight polarization measurements made on 4 days at Washington give 60 for the mean percentage of polarization, with a maximum of 66 per cent on the twenty-fourth. At Madison, polarization measurements made on 4 days give a mean of 72 per cent with a maximum of 75 per cent on the fifth. These are above the corresponding averages for each station in November.

Data received too late to be included in Table 2 for October.

Gainesville, Fla., weeks beginning, October..	1	8	15	22
Weekly averages of solar radiation, gr. cal.				
min. cm ²	307	308	403	354
Departures from normal values.....	-92	-88	-8	-46